

CLAIMS

1. A bending wave loudspeaker having an operating frequency range and a coincidence frequency which is above the operating frequency range, comprising a resonant panel  
5 having a main or major axis and a cross or minor axis and an aspect ratio of at least 2:1, vibration exciting means coupled to the panel to excite the panel into resonance along the cross or minor axis of the panel, and means restraining or preventing resonance along the main or major  
10 axis of the panel whereby the panel radiates an acoustic output which is of wide directivity along the cross or minor axis and of narrow directivity along the main or major axis of the panel.
2. A loudspeaker according to claim 1, wherein the panel  
15 is rectangular.
3. A loudspeaker according to claim 1 or claim 2, wherein the vibration exciting means forms the means restraining or preventing resonance along the main or major axis.
4. A loudspeaker according to claim 3, wherein the  
20 coupling of the vibration exciting means to the panel is longer than the wavelength of sound in air at the lowest required frequency.
5. A loudspeaker according to any preceding claim, wherein the vibration exciting means comprises a line of  
25 discrete exciters extending along the main or major axis and operated substantially in phase.
6. A loudspeaker according to claim 5, wherein the spacing between the exciters is not substantially greater

than half the wavelength in the panel at the highest operating frequency.

7. A loudspeaker according to claim 5 or claim 6, wherein the line is rectilinear.

5 8. A loudspeaker according to any one of claims 5 to 7, wherein the line extends substantially from one end of the panel to the other end.

9. A loudspeaker according to any one of claims 5 to 8, wherein there are at least four exciters in the line.

10 10. A loudspeaker according to any one of claims 5 to 9, wherein the line of exciters is to one side of the median longitudinal axis of the panel.

11. A loudspeaker according to claim 10, wherein the line is on the nodal line of the first lateral bending mode.

15 12. A loudspeaker according to any one of claims 5 to 11, wherein the exciters are equally spaced along the line.

13. A loudspeaker according to any one of claims 5 to 12, wherein the exciter spacing  $d$  in the line and the bending stiffness  $B$  and areal density  $\mu$  of the panel substantially

20 conform to the formula:-

$$\frac{B}{\mu} = \left( \frac{cd}{\pi} \right)^2$$